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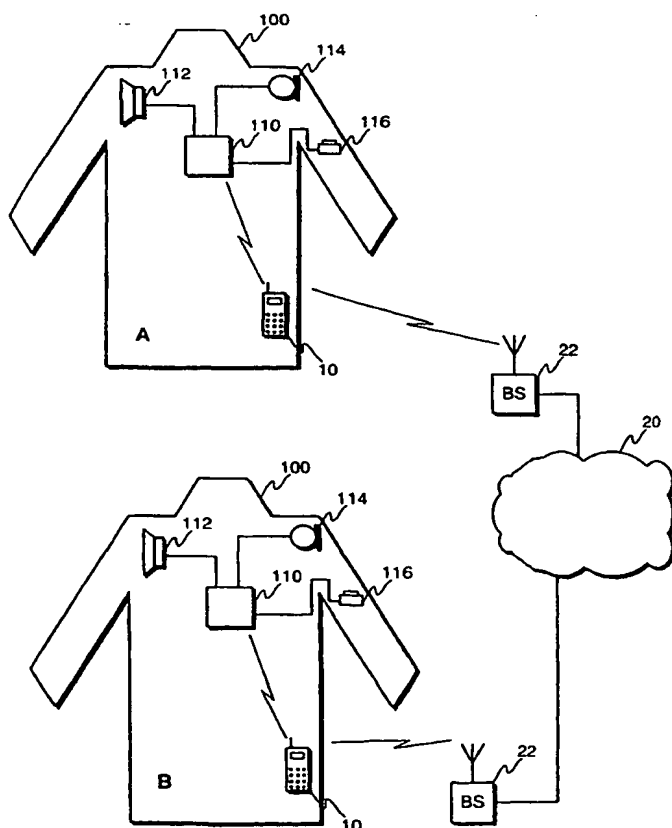
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(54) Title: SYSTEM AND MOBILE STATION FOR SENDING AND RECEIVING SOUND MESSAGES



(57) Abstract: The system includes a key (116), a microphone (114), a loudspeaker or a headphone (112), and a central processing unit (110). The system is connected to, or integrated in, a mobile station (10). The system can be an integrated part of a garment (100). A sound message is sent directly while the sender is speaking, or after intermediate storage.

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System and mobile station for sending and receiving sound messages

OBJECT OF THE INVENTION

The invention relates to signalling systems.

5 DESCRIPTION OF TECHNOLOGICAL BACKGROUND

Signalling often constitutes a problem, especially in hard environmental conditions, with long distances between the persons involved. With short distances, persons may simply call to each other in a loud voice. With longer distances, persons may call each other using a mobile station. However, mobile stations have the inconvenience of being small-sized and sensitive, and hence it is difficult, or even impossible, for somebody wearing thick gloves to use these devices for instance in pouring rain. Current mobile station systems require a user to call the other users separately, and do not allow easy and rapid signalling similar to hailing.

BRIEF DESCRIPTION OF THE INVENTION

15 The object of the invention is to provide a system that allows easy and rapid signalling even in hard conditions.

These objects are achieved by providing a system that is capable of transmitting a short message to the receivers, and to repeat the message without the user having to perform any separate control facility.

20 The system of the invention is characterised by the features defined in the characterising clause of the independent system claim. The subclaims describe other preferred embodiments of the invention.

The invention allows sound signals to be immediately or almost immediately exchanged between users in a very straightforward and easy way.

25 BRIEF DESCRIPTION OF THE FIGURES

The invention is explained in further detail below with reference to the exemplifying preferred embodiments and the accompanying figures, in which

figure 1 shows a solution of a preferred embodiment of the invention, and

figure 2 shows a solution of a second preferred embodiment of the invention.

The figures use the same reference numerals and signs for corresponding parts.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

5 In a preferred embodiment of the invention, a sound signal may be transmitted for instance over a mobile phone network. Figure 1 illustrates such an embodiment. Figure 1 shows a garment 100, components 110, 112, 114, 116, of the signalling system, mobile station 10, mobile station network 20 and base stations 22 in the mobile station network. In the example of figure 1, the signalling system comprises
10 a loud-speaker or a headphone 112, a microphone 114, a control means 116 such as a switch 116, and the central processing unit 110 in the signalling system. The central processing unit 110 in the signalling system is operationally connected to a mobile station 10 by any suitable prior art means, such as for instance by a coupling wire or a wireless radio link, such as for instance a "Bluetooth link". The mobile
15 station 10, in turn, communicates with the mobile station system over the radio.

The use of the signalling system exemplified in figure 1 is the following, when person A sends a message to one or more persons B. Person A presses the key 116 and speaks out the message, while the signalling system of person A receives the message over the microphone 114. The central processing unit 110 in the signalling system transmits the message to the mobile station 10, which in turn transmits the message over the mobile station system 20, 22 to the mobile station 10 of the receiving person. The central processing unit 110 in the signalling system of the receiving person receives the message from the mobile station 10 and repeats the message over the loudspeaker 112. In this example, the contact data of the receiver B have
20 been fed in advance into the user's A central processing unit 110, so that the central processing unit knows to whom the message should be sent, and thus the object does not need to be defined in the signalling situation.

The signalling system may transmit the message in two principal ways: either immediately, or after intermediate storage. In immediate transmission, the system
30 opens a communication channel between the sender and the receivers as soon as the sender starts reading out his message, and thus the message can be sent directly while the sender is speaking. When intermediate storage is used, the user's signalling system stores the message to be sent, and sends the message to the receiver after the storage.

The message can be transmitted by the mobile station system in various ways. The message may be transmitted over a conventional speech channel, so that the message can be transmitted either at the same time as the message is read out, or after any intermediate storage, or for instance as an e-mail message, and then the stored message can be sent as e-mail after the storage.

Besides a mobile station system, any other wireless radio communication can be used as the transmission channel, such as a short-range radio link, as for instance a "Bluetooth radio link". In a preferred embodiment of the invention, the signalling system thus comprises means for generating a short-range radio link. The system is preferably capable of communicating over a mobile station that can be connected to the system, and thus the system may communicate with the systems of other users over a short-range radio link when the other users are within the coverage area of the short-range radio link, and over a mobile station when the users are far from each other. A short-range radio link can be used particularly advantageously for transmitting user contact data to the central processing units in the users' signalling systems, for instance at the beginning of a given field mission, and then the programming of receiver data in the central processing unit of each user can be performed automatically. In the course of the field mission, receiver data can be transmitted by means of the mobile station system. Thus, for instance, should any new persons join the user team in course of the field mission, their data can be sent for instance by text messages, i.e. SMS messages (Short Message Service) to all the users in the team.

Other transmission methods than wireless transmission methods can be used for the transmission of the call data of the user team. In a preferred embodiment of the invention, the prior art "personal area network" solution is used, in which the user's body is used as the data transmission path. In that case, the central processing unit of the system is in electric contact with the user's body, so that when two users touch each other for instance by shaking hands, a communication channel is formed between the central processing units, which can be utilised for instance for transmitting user data. Such an embodiment allows for very rapid and easy determination of user data: all the members in the team only need to shake hands for the data on the other users to be stored in the central processing unit of each user, for future signalling purposes. In a second preferred embodiment of the invention, the users may communicate data to each other over a wire communication, for instance by interconnecting their central processing units momentarily over the lines.

Figure 2 illustrates a signalling system of a preferred embodiment of the invention. In the embodiment exemplified in figure 2, the system comprises a central processing unit 110, a loudspeaker or a headphone 114, a microphone 112, control switches 116, and other user interface means such as a signal light 118 and a switch lock 117.

5 Figure 2 also shows an auxiliary unit 119, which transmits data about the state of the keys 116 to the central processing unit 110. In this example, the auxiliary unit is mainly used in order to reduce the amount of wiring, so that enhanced service reliability of the system is obtained in demanding circumstances. It should be noted that the switches 116 could also be connected directly to the central processing unit
10 110. The switch lock 117 has the purpose of preventing the impact of unintentional keystrokes on the operation of the system. The central processing unit 110 preferably takes account of the keystrokes only when the switch lock 117 - which can advantageously be carried out with the aid of a switch - is not in a blocked state. In the example of figure 2, the system also comprises a radio link means 120, which may
15 be for instance agreeing with a "Bluetooth standard" transceiver unit 10. In the example of figure 2, the system is operationally connected to a mobile station 10. In a preferred embodiment of the invention, the system is connected over a line to a mobile station 10, so that the system is allowed to utilise the power source of the mobile station for output power supply. Solutions of other types are also conceivable,
20 because the system may for instance comprise also an accumulator or a battery to generate operation power. The switch lock 17 may consist for instance of a switch connected to a pocket or to a piece of fabric that can be turned up, and then the keys can be struck after the pocket or the piece of fabric has been turned up. The same pocket or piece of fabric can preferably accommodate various control switches 116,
25 so that the switches are protected by the pocket or the piece of fabric when these are turned down to closing position.

Instead of, or in addition to a signal light 118, the system may comprise means for generating a sound alarm signal or means for generating a tactile alarm signal, such as for instance a vibration alarm device.

30 The system in figure 2 can be advantageously implemented as an integrated part of a garment. Such a garment may be for instance a coat, an overall for working or racing purposes, or any other suitable garment. It should be noted that such a system can be implemented also at any other location than in a garment, such as for instance in a helmet or a vehicle.

35 The message can be transmitted to a selected group or individual. The sender may read out the message to be transmitted or for instance choose one among a number

of messages stored in advance. The message can be transmitted for instance as an ordinary call, and then the system takes care of setting up and disconnecting the call. A sound signal, the sender's identification, and in a preferred embodiment of the invention, information that the content of the message is a message to be transmitted and not an ordinary call, are transmitted along with the message. The receiving system stores the received message and the sender data. The receiving system repeats the received message. In a preferred embodiment of the invention, the receiving system also leaves a specific sign telling about the message received. Such a sign may be for instance a signal light, which the system leaves on as a sign of the received message. In the most preferred embodiments, message reception does not require any response action of the user, but the system repeats the message automatically without any separate control by the user. In a preferred embodiment of the invention, the receiving system stores the received message, so that it will be possible to listen to the message once more later. In a preferred embodiment of the invention, the message receiver may also answer all the members in the team, or for instance only the sender of the original message.

The user interface in the receiving garment should be adapted for immediate display of the message. The device may be for instance a garment with a loudspeaker at the collar. The garment may be for instance a coat or an overall. The interface is preferably accomplished so as to allow use by a person wearing thick gloves. The user interface may for instance consists of a microphone, a loudspeaker and a switch, and then the system stores a sound signal when the key is struck, and after the switch has been released, the system transmits the sound signal to the target person or persons, whose system repeats the message over the loudspeaker of the user interface. In such an embodiment, the one or more receivers can most preferably be chosen in advance, so that the target persons do not have to be selected in field situations and under conditions that may be extremely difficult. If the user interface is equipped with any kind of selection facility, the user may chose the person to send the message to, before the message is actually sent. It should be noted that the choice and implementation of the interface functions depend on each object of use, and hence the invention is not restricted to any specific interface structure. In fact, for practical reasons, an interface adapted to extremely strenuous field conditions may eventually require very straightforward implementation in order to retain its service reliability, and, by contrast, an interface adapted for slightly easier conditions may comprise more versatile control facilities.

The sender and the receiver device may be a conventional terminal in a telecommunication network, such as for instance a GSM phone, a mobile station of some other type, or a telephone in a fixed phone network. When the signalling system is integrated in a mobile station, the facilities it requires can preferably be carried out in the mobile station using program software.

In the various embodiments of the invention, the user data may comprise data of various types. In one embodiment, the user data comprise e.g. the user's name, the mobile phone number, and the identification of the user group.

In one embodiment of the invention, the arrangement of the invention can be implemented also as an integrated part of a mobile station. In such an arrangement, the mobile phone has been adapted to store the sound signal dictated by the user and to transmit the stored sound signal. Such a mobile phone is also adapted to repeat the received sound signal without any special control operations by the user. Such an arrangement can be implemented in conventional mobile stations in a digital mobile station system by programming. In a preferred embodiment of the invention, a mobile station in digital mobile station system comprises

- means for storing a sound signal
- means for transmitting a stored sound signal,
- means for receiving a sound signal, and
- means for automatic repetition of the received sound signal.

The following is the description of an example of the operation of a system of a preferred embodiment of the invention. In this example, the user A transmits a message to a receiver B or to a plurality of receivers B. First, the user A chooses the signalling function by means of the system of the invention integrated in his or her garment, for instance by striking a specific key, and then the system of the user A starts storing the message. The user A reads out his message, which the system of user A digitises and stores in its memory. After the message dictation, the system of user A calls the system of receiver B using the mobile station. The mobile station connected to the receiver's system answers the call immediately, and then the sender's system starts repeating the message over the mobile station communication and the receiver's system starts storing the message. The sender's system disconnects the mobile station communication immediately after the message transmission. The receiver's system repeats the message over the loudspeaker or the headphone. The re-

ceiver's system may repeat the message either immediately during the transmission, or not until the entire message has been received and stored, for instance.

If there are more than one receiver, the sender's system may transmit one message at a time to each receiver. If the mobile station system in use supports conference calls, the sender's system may for instance also arrange a conference call for the entire group of receivers, and then the message is transmitted at once to the entire group of receivers.

In a preferred embodiment of the invention, the mobile station communication between the sender and the receiver is maintained if the receiver reacts on an incoming message during the message by striking a given key, for instance. In that case, a conventional mobile station communication is maintained between these persons, who can thus talk to each other.

In a preferred embodiment of the invention, the arrangement of the invention comprises at least part of the following functions:

- 15 - receiving a sound signal,
- repeating a previously received message,
- answering a received message to the entire user group,
- answering a received message only to the sender of the message,
- sending a sound signal,
- 20 - sending an acknowledgement after a sound signal has been received,
- joining a user group,
- leaving a user group,
- choosing an active user group,
- answering a conventional incoming mobile station call,
- 25 - refusing to answer a conventional incoming mobile station call,
- giving a sound alarm signal,
- giving a visual alarm signal,

- giving a tactile alarm signal,
- checking the group composition,
- setting up a new user group.

5 The system may advantageously comprise a display means for displaying user data and group data. The system of the invention may also utilise the display of a mobile station for this purpose.

Claims

1. A system that can be operationally connected to a mobile station, **characterised**
in comprising
 - a central processing unit for storing sound signals,
- 5 - a microphone, and
- a loudspeaker for repeating received sound signals.
2. A garment, **characterised** in comprising a system that can be operationally connected to a mobile station, the system including
 - a central processing unit for storing sound signals,
- 10 - a microphone, and
- a loudspeaker for repeating received sound signals.
3. A garment as defined in claim 2, **characterised** in that the garment is a coat.
4. A garment as defined in claim 2, **characterised** in that the garment is an overall.
5. A garment as defined in claim 2, **characterised** in that it also comprises a mobile
- 15 station.
6. A mobile station in a digital mobile station system, **characterised** in comprising
 - means for storing a sound signal,
 - means for sending a stored sound signal,
 - means for receiving a sound signal, and
- 20 - means for automatic repetition of a received sound signal.

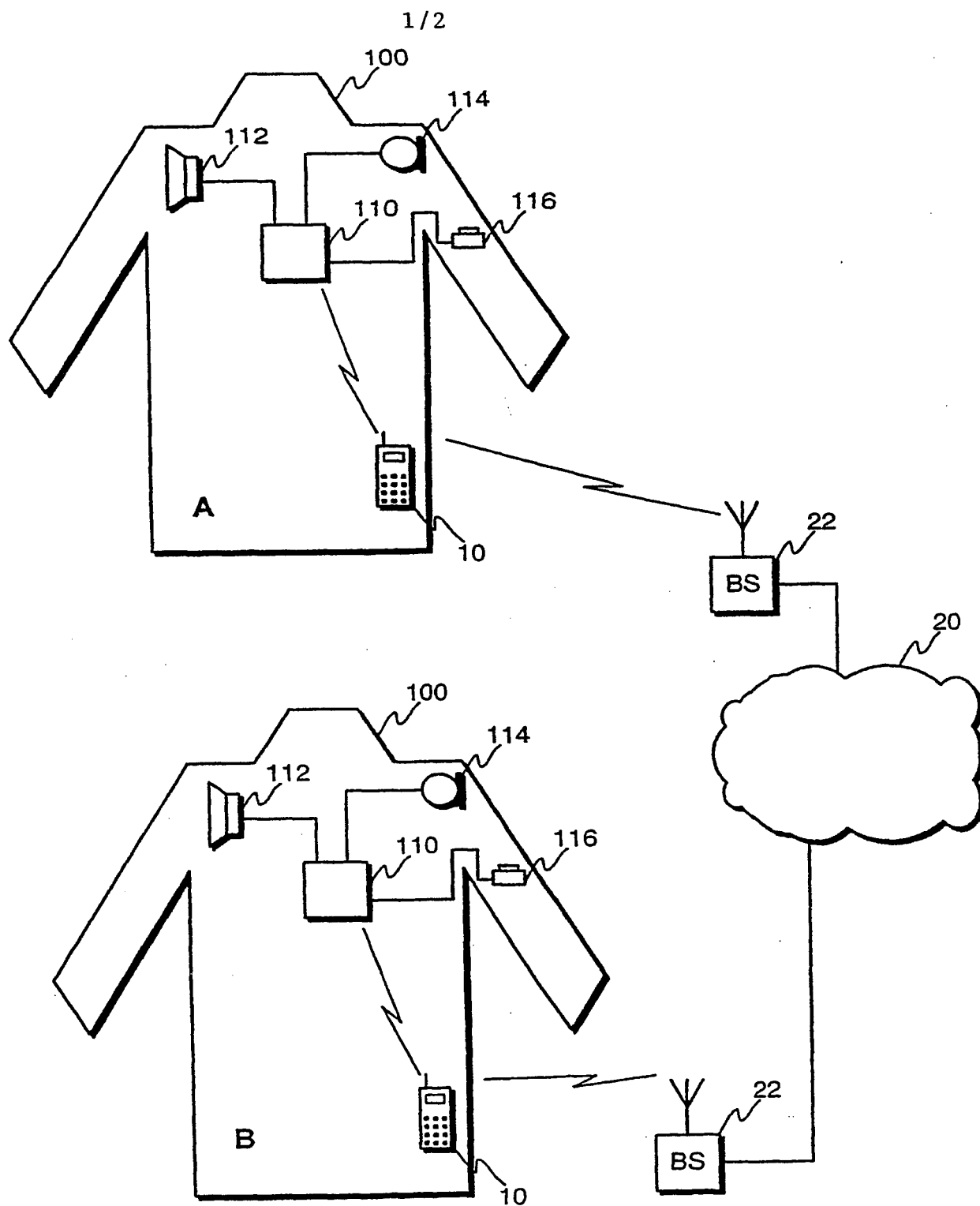
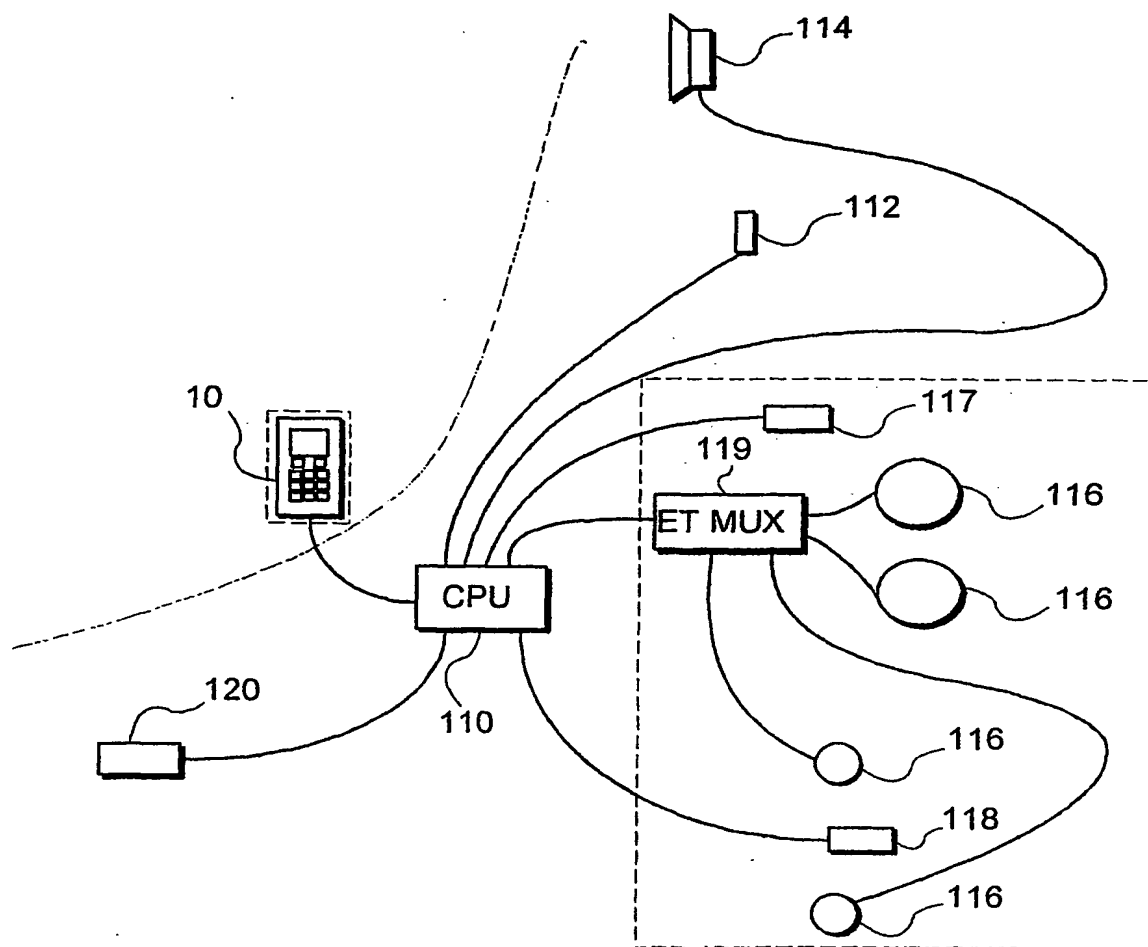


Fig. 1

SUBSTITUTE SHEET (RULE 26)

**Fig. 2**

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 01/00174

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04M 1/00, H04Q 7/22, H04Q 7/28
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04M, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5697060 A (MASAAKI AKAHANE), 9 December 1997 (09.12.97), column 5, line 16 - line 29; column 3, line 47 - line 54, figures 1-5, abstract --	1-6
A	WO 9913629 A1 (WESBY, PHILIP, BERNARD ET AL), 18 March 1999 (18.03.99), page 2, line 23 - page 8, line 4, figures 1-3, abstract --	1-6
A	WO 9807239 A1 (ERICSSON INC), 19 February 1998 (19.02.98), figures 1-4, abstract --	1-6

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

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INTERNATIONAL SEARCH REPORT

International application No.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 2285083 A (B.E. COVER, SR), 2 June 1942 (02.06.42), page 1, column 2, line 15 - page 3, column 1, line 2, figures 1-11</p> <p style="text-align: center;">-- -----</p>	1-6

INTERNATIONAL SEARCH REPORT
Information on patent family members

02/07/01

International application No.
PCT/FI 01/00174

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
US	5697060	A	09/12/97	NONE		
WO	9913629	A1	18/03/99	AU	9083598 A	29/03/99
				EP	1013055 A	28/06/00
				FI	973637 D	00/00/00
WO	9807239	A1	19/02/98	AU	3976797 A	06/03/98
				US	5884198 A	16/03/99
US	2285083	A	02/06/42	NONE		